

BRIDGE NO. 110
Spanning the Wepawaug River and
Prospect Street at Metro-North Railroad
Milford
New Haven County
Connecticut

HAER No. CT-47

HAER
CONNS
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Northeast Field Area
Chesapeake/Allegheny System Support Office
National Park Service
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

HISTORIC AMERICAN ENGINEERING RECORD

BRIDGE NO. 110

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Location: Metro-North Railroad Bridge spanning the Wepawaug River and Prospect Street in Milford, New Haven County, Connecticut

UTM: 18.662950.4565198
Quad: Milford, Connecticut, 1:24,000

Date of Construction: 1893 - 1894, Altered 1943, 1949

Designer: W.H. Moore

Fabricator: Berlin Iron & Bridge Co., East Berlin, Connecticut

Present Owner: Connecticut Department of Transportation
24 Wolcott Hill Road
P.O. Drawer A
Wethersfield, CT 06109

Present Use: Carries four tracks of the Metro-North Commuter Railroad, New Haven - New York Line

Significance: Bridge No. 110 was part of the railroad expansion program and was constructed between 1892 and 1896. Designed in 1893 by F.S. Curtis, Chief Engineer and constructed in 1894, the structure has basically maintained its integrity since its original construction. The Bridge over Wopowage River is a double span open deck parallel truss structure with a total length of 127 feet. It is important in local history for its contribution to the economic development of the region.

Project Information Statement:

This documentation was undertaken in February, 1990, in accordance with the memorandum of the Connecticut Historical Commission as a mitigative measure prior to the rehabilitation of the bridge.

Dennis L. Miller, P.E.
Project Engineer
Frederic R. Harris, Inc.
Stamford, Connecticut

In 1894, a railroad bridge that spanned Prospect Street and what was then known as the Wopowage River in Milford, Connecticut, was built under the auspices of the New York, New Haven and Hartford Railroad¹. It was built as part of an ambitious program to improve rail transportation between New Haven, Connecticut and New Rochelle, New York. Specifically, the program called for the expansion of the then existing two-track railway to a four-track system, along with the necessary bridges needed to accommodate this new rail capacity. Those portions of the railway located within the town of Milford were designed and constructed between the years of 1892 and 1896². The railway was publicly owned at this time (and for many ensuing years) and funding for this project was naturally accomplished through the issuance of stocks and bonds³. Electrification of the railroad between New Haven and New York was later undertaken and was completed in 1914⁴.

It should be remembered that railroads at the end of the 19th Century (when Bridge No. 110 was built) served as the chief means of transportation within Connecticut. Aside from carrying passengers and commuters, the trains also transported all manner of goods and commodities, from farm produce to livestock to non-perishable retail goods. A great deal of capital was invested in railways during this period, and huge profits were to be gained by those who invested and managed wisely⁵.

That "Yankee Empire" known as the New York, New Haven and Hartford Railroad under the leadership of various illustrious people in history such as J.P. Morgan and Charles Sanger Mellen, ran strong during the early part of the 20th Century⁶. The automobile had a decisive effect on the subsequent demise of the railroad. People were traveling less by train, and trucks could be used to transport market goods⁷. Finally, in 1968, Penn Central Transportation Company, under court order, assumed management responsibilities for the bankrupt railway. Even though Penn Central eventually lost its power to operate trains on Connecticut lines, it still maintained ownership of the New Haven tracks until they were purchased by the Connecticut Department of Transportation in October, 1985⁸. Presently, the traffic on the New Haven line is composed overwhelmingly of passengers and commuters. The Metro-North trains serve as a vital link in the transportation network carrying commuters to and from the greater New York City metropolitan area and as such, each component of their system is an integral contributor to the economic development of the area.

Bridge No. 110 is located approximately one thousand feet east of the Milford train station. The bridge is thus about one-quarter mile east of the City of Milford's current

central business district. Since a right-of-way has been established for the area enclosing the bridge, the bridge is essentially isolated from its neighboring properties, lying as it does within a rather scenic park area. There are houses surrounding the railway right-of-way east of the bridge. West of the bridge, retail business and restaurants begin to appear within a distance of three hundred feet. One block south of the bridge stands the Town library.

The most complete source of historical documentation of the bridge may well be the extant design plans and shop drawings. The drawings supplied by Metro-North provide extensive information regarding the original design of the bridge as well as the various alterations and rehabilitation performed on the structure since its erection in 1894.

According to the drawings, the bridge was designed in 1893 under the supervision of F.S. Curtis, Chief Engineer. The name of W.H. Moore appears on the drawings as the "Engineer of Bridges". Construction of the bridge began December, 1893, and was completed in February, 1894⁹. The bridge has maintained its integrity since its original construction, there being only two alterations made to the structure in addition to some maintenance work and minor improvements. The bridge as it stands today thus strongly resembles the original conception of 1893.

Bridge No. 110 is a double-span, open deck, parallel truss structure with a total length of 127 feet. The span over the river measures 94 feet, while the span over Prospect Street measures 33 feet (Bridge drawing - End Elevation). The bridge width, which includes the four railroad tracks and a catwalk running along the north side, measures approximately 48 feet¹⁰.

Each track is framed independently for both spans. The tracks run along bridge timbers fastened to the top chord or flange of the superstructure. The river span consists of eight Riveted Double Intersection steel truss panels, each with a length of twelve feet and a depth of thirteen feet (Bridge drawings - South Truss-West End and Elevations of North Truss). Portals appear on the ends of each truss and intermediate portals are located every other panel. The street span consists of 45-inch deep riveted steel plate girders. Girder spacing for both spans is about seven feet (Bridge drawings - Riveted Girder)¹¹.

It might seem unusual that both spans of the structure are stylistically different. Even a casual observer will notice the bridge's curious appearance brought about in no small measure by the juxtaposition of a riveted girder plate span with a truss span. This can

be explained by the great variance in the length of the two spans as well as the economics of the times. The labor intensive truss construction with more efficient use of materials was employed whenever feasible in those days due to the high steel costs as compared to that of labor.

Each truss member, through use of typical procedures of the day, was individually fabricated by joining any one of diverse combinations of plates and angle sections. (These composite sections provide similar stress-reducing capabilities as modern structural steel sections, such as I-Beams and T-Beams.) In the case of the riveted girder span, angle sections are not so much joined together as they are riveted directly onto the 45" web plate. Open-hearth steel was used to build all components of the superstructure. Although the type of steel used is not known with certainty, the steel may well be similar to type A7, according to one structural engineer. The structure was originally painted. This paint later peeled off, but has subsequently been replaced¹².

The substructure consists of two masonry abutments -- both with stone seats but one was subsequently replaced with a concrete seat -- and cut stone stems and wingwalls. The pier and abutment type foundation, which is built upon rock, uses mortar to bond the stone. Although the intermediate pier was constructed originally of stone, it has subsequently been encased with reinforced concrete. The bridge bearings are of the sliding plate type.

In 1917, new bearing stiffeners at the east abutment of the bridge were installed for the riveted girders at Tracks #2 and #4. Work was done during the 1930's to strengthen the end post at the pier and to repair the end post, pier, truss, bearings, abutment and girders. The only two alterations to the bridge were made during the 1940's and consisted of the installation of a shoe plate on the west abutment (1943) and rebuilding the pier (1949), at which time the pier was encased in concrete. In 1953, grillage for the north truss at the pier for Track #3 was designed and installed¹³.

Footnotes

¹W.H. Moore "Bridge No. 110" Wopowage River and Highway, Milford, CT" (1893-4).

²Una Glennon, ed, et al, History of a New England Hometown: Milford, CT 1639-1989 (Graphic Image Publishers, Inc. 1989), p.115.

³Gregg M. Turner and Melancthon W. Jacobus, Connecticut Railroads: An Illustrated History (Hartford, CT: The Connecticut Historical Society, 1986), p.205.

⁴Glennon, p. 115.

⁵Turner and Jacobus, pp. 205, 212, 215.

⁶Ibid, p. 212

⁷Ibid, p. 210

⁸Ibid, pp.282-3.

⁹Moore.

¹⁰Hayden-Wegman, Inc. Connecticut Fixed Bridge Inventory and Inspection Program, Bridge No. 63.55 (New York, January, 1988), p. I-1.

¹¹Moore.

¹²Ibid.

¹³"Bridge No. 51.61 over Wepawaug River", (Bridge Revision Plans) January 8, 1953

Bibliography

Cornwall, L. Peter and Carol A. Smith. Names First - Rails Later: New England's 700-Plus Railroads and What Happened to Them. Stamford, CT: Arden Valley Group, 1989.

Glennon, Una, ed., et al., History of a New England Hometown, Milford, CT 1639-1989 Graphic Image Publishers, Inc., 1989.

Jensen, Oliver. The American Heritage History of Railroads in America, New York: McGraw - Hill Book Company, 1975.

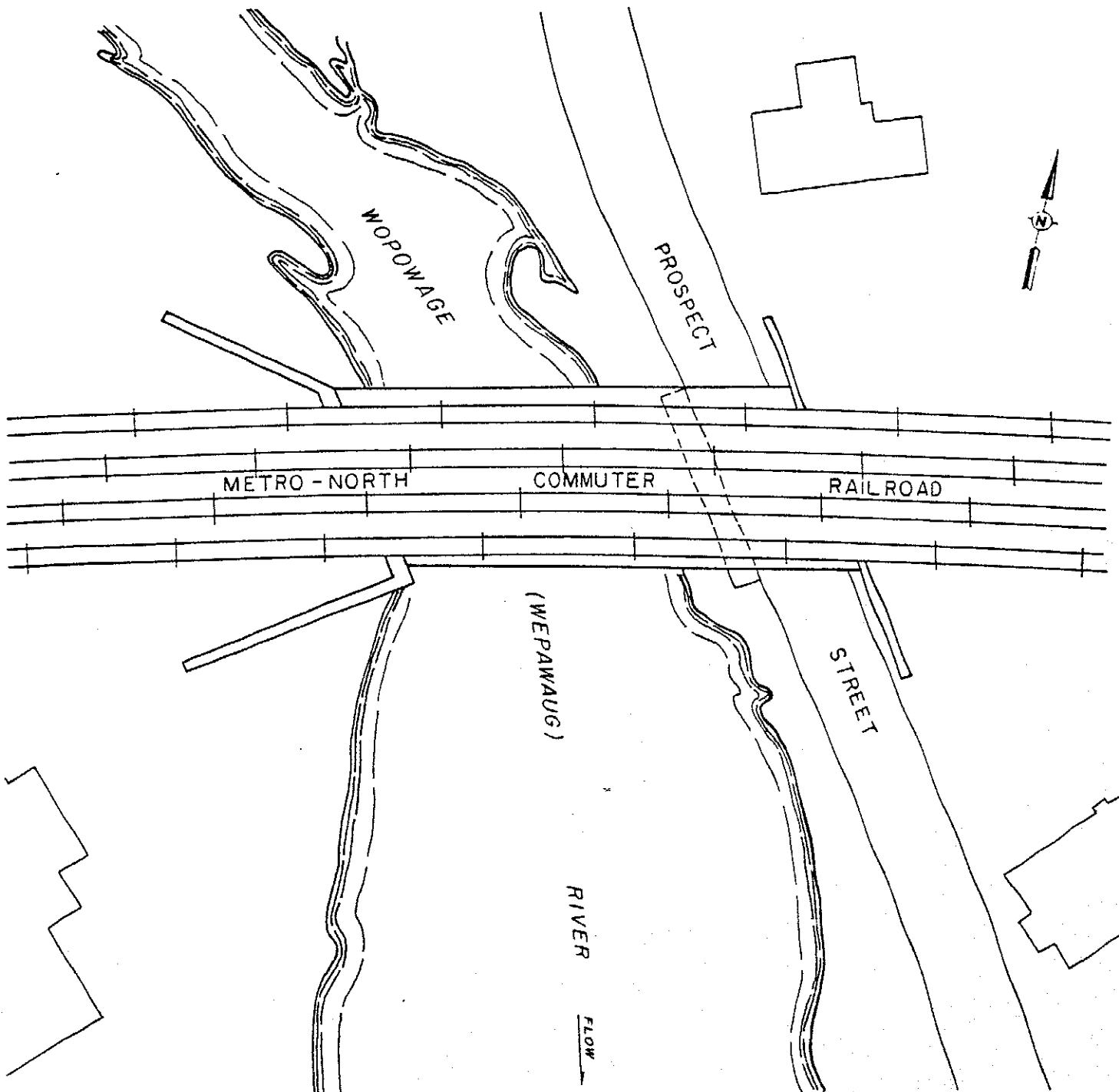
Moore, W.H. "Bridge No. 110: Wepawaug River and Highway, Milford, CT" (Original Design Drawings, 1893-4).

Turner, Gregg M. and Melancthon W. Jacobus. Connecticut Railroads: an Illustrated History. Hartford, CT: The Connecticut Historical Society, 1986.

_____. "Bridge No. 51.61 over Wopowage River" (Revision Plans, 1931-53).

SITE PLAN

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SCALE: 1" = 40'